380Z DISC FORMATS SD

1. 8" DISCS

This section describes the format of information held on 8" floppy discs for the RML 380Z CP/M single density 1.4 implementation.

1.1 Physical Format

8" single density discs are formatted to have 77 tracks on each side (numbered 0 to 76) each of which contains 26 sectors (numbered 1 to 26) of 128 bytes, giving a total data space of 250Kbytes.

Each sector has a header which indentifies the track and sector numbers and is written when the disc is formatted. The standard formatter numbers sectors sequentially around the track from 1 to 26. The complete format of a track is shown in Appendix A.

Other format programs exist which produce different layouts of sectors.

1.2 Use by CP/M

CP/M reserves tracks 0 and 1 for binary copy of the CP/M system.

Track 2 contains 16 sectors of directory followed by 10 data sectors.

Tracks 3 to 76 are data tracks.

Space for files is allocated in 8 sector (1Kbyte) units which are numbered from 0 at the start of track 2.

The sectors within a track are not used sequentially by CP/M. It uses them in the order:

1, 7, 13, 19, 25.
5, 11, 17, 23.
3, 9, 15, 21.
2, 8, 14, 20, 26.
6, 12, 18, 24.
4, 10, 16, 22.

Corresponding to a 1:6 interlace.

Thus, the first data allocation unit on the disc comprises Track 2 Sectors 20, 26, 6, 12, 18, 24, 4, 10 and the second comprises Track 2 Sectors 16, 22 and Track 3 Sectors 1, 7, 13, 19, 25, 5.

2. 5.25" DISCS

This section describes the format of information held on 5.25" floppy discs for the RML 380Z CP/M single density 1.4 implementation.

2.1 Physical Format

5.25" single density discs are formatted to have 40 tracks on each side (numbered 0 to 39) each of which contains 16 sectors (numbered 1 to 16) of 128 bytes, giving a total data space of 80Kbytes.

Each sector has a header which identifies the track and sector numbers and is written when the disc is formatted. The standard formatter numbers sectors sequentially around the track from 1 to 16. The complete format of a track is shown in Appendix B.

2.2 Use by CP/M 1.4

CP/M reserves tracks 0 to 2 for binary copy of the CP/M system.

Track 3 contains the directory.

Tracks 4 to 39 are data tracks

Space for files is allocated in 8 sector (1Kbyte) units which are numbered form 0 at the start of track 3.

The sectors within a track are not used sequentially by CP/M. It uses them in the order:

1, 4, 7, 10, 13, 16,
3, 6, 9, 12, 15,
2, 5, 8, 11, 14

Corresponding to a 1:3 interlace.

Thus, the first data allocation unit on the disc comprises Track 4 Sectors 1, 4, 7, 10, 13, 16, 3, 6 and the second comprises Track 4 Sectors 9, 12, 15, 2, 5, 8, 11, 14.

3. CP/M FILING STRUCTURES

3.1 CP/M 1.4 Directory Entry

A CP/M 1.4 directory entry comprises 32 bytes arranged as:

BYTE

0	Flag (0 if entry in use, E5H if erased)
1-8	Filename
9-11	File type
12	Extent number (0 ...31)
13	Reserved
14	Reserved
15	Record Count in this extent (80H if full)
16-31	Numbers of the allocation units in this extent.

Note that large files (>16Kbytes) require multiple directory entries, one for each 16Kbyte extent. These are numbered sequentially from 0 (in byte 12). They may appear in any order in the directory.

3.2 CP/M or MP/M 2 Directory Entry

A CP/M 2 (or MP/M 2) directory entry has a similar format but the uses of certain fields are extended, as follows:

BYTE

0	Flag (User number if file in use, E5H if erased).
1-8	Filename*
9-11	File type*
12	Extent number
13	Reserved
14	Reserved
15	Record count in this extent.
16-31	Numbers of the allocation units in this extent. If less than 256 allocation units on disc then the field is used as 16 bytes.

If there are more than 255 allocation units, allocation units must be larger than 1K bytes, and the field is used as 8 words.

*Bit 7 of bytes 1-11 is reserved for attribute bits which are allocated as follows:-

BYTE

1	Available to user
2-4	Reserved by Research Machines
5-8	Reserved by Digital Research
9	Read-only file
10	System file
11	Archived file (MP/M 2)

3.3 CP/M File Space Allocation

CP/M reads through the directory when it logs on to a disc and creates an allocation map showing which allocation units are used. When space is required for a file, an attempt is made to allocate it close to the previous one.

3.4 File Contents

The file contents depend on how it was created. Files created by TXED have records blocked together into sectors. Each record is terminated by CRLF (OD, OA). The last sector is padded out with CTRL-Z(1A).

APPENDIX B

TRACK FORMAT = SINGLE DENSITY 5.25" DISCS.

This describes the format perceived when a track is read into store by a read-track command to the disc controller chip.

Each sector comprises:

```
      0FEH     (ID Address Mark)
      Track no.
      0
      Sector no.
      0
   2 x CRC      (see note 1)
  11 x 0FFH
   6 x 0
      0FBH     (Data Address Mark)
 128 x data bytes
   2 x CRC      (See note 1)
  27 x 0FFH
```

The first sector is preceded by:

A gap of about 23 bytes, mostly 0FFH.

Between sectors is

6 x 0

Following the final sector is:

a variable number of 0FFH

Note 1) The 16-bit CRC is calculated as follows using the polynomical

$G(x) = x^{16} + x^{12} + x^{5} + 1$

and covers both the address mark and the data. The CRC register is set to ones before data is shifted in.